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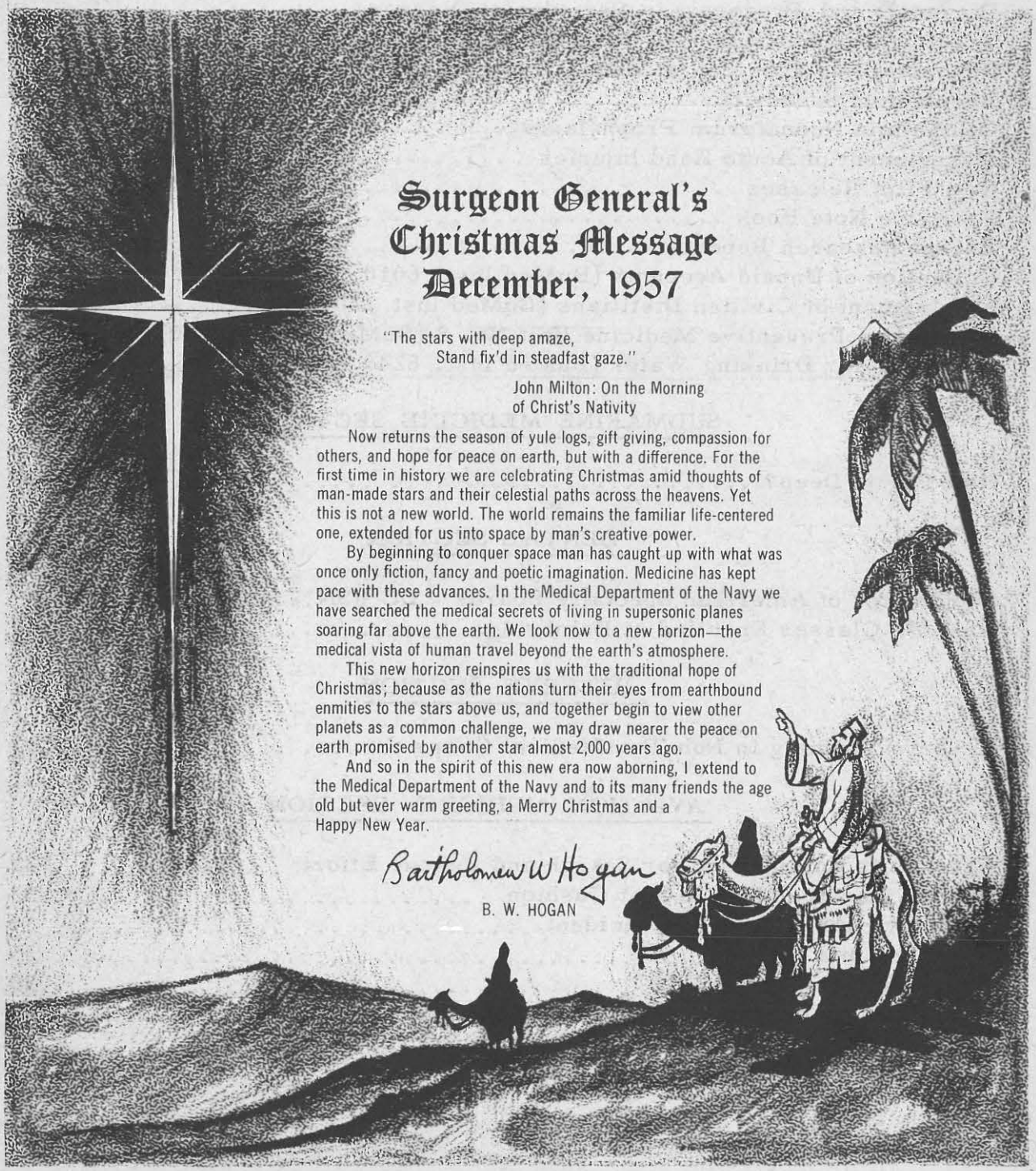
UNITED STATES NAVY

# MEDICAL NEWS LETTER



## Surgeon General's Christmas Message December, 1957

"The stars with deep amaze,
Stand fix'd in steadfast gaze."

John Milton: On the Morning
of Christ's Nativity

Now returns the season of yule logs, gift giving, compassion for others, and hope for peace on earth, but with a difference. For the first time in history we are celebrating Christmas amid thoughts of man-made stars and their celestial paths across the heavens. Yet this is not a new world. The world remains the familiar life-centered one, extended for us into space by man's creative power.

By beginning to conquer space man has caught up with what was once only fiction, fancy and poetic imagination. Medicine has kept pace with these advances. In the Medical Department of the Navy we have searched the medical secrets of living in supersonic planes soaring far above the earth. We look now to a new horizon—the medical vista of human travel beyond the earth's atmosphere.

This new horizon reinspires us with the traditional hope of Christmas; because as the nations turn their eyes from earthbound enmities to the stars above us, and together begin to view other planets as a common challenge, we may draw nearer the peace on earth promised by another star almost 2,000 years ago.

And so in the spirit of this new era now aborning, I extend to the Medical Department of the Navy and to its many friends the age old but ever warm greeting, a Merry Christmas and a Happy New Year.

Bartholomew W Hogan

B. W. HOGAN

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## Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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## Problems Associated with Routine Immunizations

New information relating to the prevention of disease by immunization demands that from time to time existing practices be modified and appraised. New biologicals are developed; new reactions are recognized; and new epidemiologic patterns, brought about in part by immunization practices, are documented; new vaccines against hitherto uncontrolled disease are added to immunization. schedules.

This article considers these developments as they relate to diphtheria, tetanus, pertussis, smallpox, and poliomyelitis—the diseases against which immunizing prophylaxis is most generally practiced in the United States.

In view of the extensive use in this country of biologicals incorporating diphtheria and tetanus toxoids and pertussis vaccine (DPT antigen) for immunizing young children, it is surprising that all doubts have not been dispelled as to the wisdom of using such combined vaccines rather than consecutive courses of single antigens. The combined vaccine offers the obvious advantages of a decreased number of injections and protection against all three diseases at an earlier age than is possible with single antigens. Possible disadvantages arise from claims that two or more antigens given concurrently may interfere with each other, inducing a less than adequate antibody response against one of them. As yet, a controlled field trial extensive enough to discount these claims completely has not been conducted, but such a study is in progress in Great Britain.

A definitive answer to the problems of combined immunization as may be expected from the British study is eagerly sought now that the possibility of including poliomyelitis vaccine with DPT is being discussed.

There does not appear to be an increase in the number or severity of reactions to vaccine mixtures as compared with those following antigens given separately.

Until recently, most authorities advocated deferring immunization until at least 6 months of age on the basis that younger infants were less able to produce antibodies and that the passively acquired (transplacental) circulating antibodies interfered with development of active immunity.

There are good reasons to begin and complete the primary course of immunizations as early as possible. Very young infants have undesirable reactions to immunizations less commonly than do older ones. Further, the morbidity and mortality rates of some diseases are highest in the first year of life. From 50 to 70% of the deaths from pertussis occur at this age. Obviously, unless the primary course of immunization is completed very early, some infants will succumb to a preventable disease. It is now common practice to give the first immunization at the 6-week checkup and to complete the full course of primary immunization—including smallpox vaccination—by the age of 6 months.

The following schedule of immunization seems reasonable on the basis of present knowledge:

Primary Immunizations

| Age | Agent |
|---|---|
| 2 months | 0.5 ml. DPT (with adjuvant) |
| 3 months | 0.5 ml. DPT (with adjuvant) |
| 4 months | 0.5 ml. DPT (with adjuvant) |
| 5 months | Smallpox vaccination |
| 6 months | 1.0 ml. Salk vaccine |
| 7 months | 1.0 ml. Salk vaccine |
| 14 months | 1.0 ml. Salk vaccine |

Changes in sequence of injections, type of antigen, and intervals between injections may be indicated for local epidemiologic or individual reasons. Greater intervals between injections than those indicated are not disadvantageous except for the delay in completing immunization.

Boosters

| Age | Agent |
|---|---|
| 18 months | 0.5 ml. DPT (with adjuvant) |
| 4 years | 0.5 ml. DPT (with adjuvant); smallpox vaccination |
| 7 years | 0.25 ml. DT (with adjuvant) |
| 10 years | smallpox vaccination; Schick test; diphtheria toxoid sensitivity test; 0.25 ml. DT (with adjuvant) if Schick test is positive and toxoid sensitivity test is negative; otherwise 0.25 ml. T (with adjuvant) |

The booster schedule listed for age 10 years should be repeated every 3 years, except for smallpox vaccination which is done every 5 or 6 years. Additional boosters with fluid toxoids and revaccination against smallpox may be necessary due to risk of exposure.

As yet, data are not available to indicate how frequently boosters of Salk vaccine must be given—if at all. It would not be unreasonable to give booster injections of 1.0 ml. every 3 years until contradictory information becomes available.

One should not immunize any child with a respiratory or any other acute infection until he recovers completely. One may immunize allergic children; however, any dermatitis—including eczema—involving the patient or a close contact contraindicates vaccination against smallpox. Children with convulsive disorders should be immunized, probably with fractional doses.

During a local outbreak of poliomyelitis, one should defer elective DPT injections because of a slightly greater risk of the development of paralytic poliomyelitis involving the injected extremity. (Miller, C.A., Problems Associated with Routine Immunizations: Postgrad. Med., 22: 445-453, November 1957)

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## Bronchiectasis and Acute Pneumonia

Bronchiectasis has been considered a disease that originates in childhood after a severe respiratory infection. During the past 10 years, however, studies on young adults who recently had bouts of acute pneumonia suggested that adult infections might also be a cause of bronchiectasis. Studies of the stability of such "postpneumonic bronchiectasis" have indicated that in some instances the bronchogram naturally reverts to normal. The present study is concerned with the incidence, diagnostic features, and stability of bronchiectasis first discovered after recent pneumonic infections. The question of the etiologic role of the immediately preceding pneumonia is discussed.

The clinical records and roentgenograms of 94 patients on whom bronchograms were performed over a 28-month period at the U.S. Army Hospital, Fort Dix, N.J., were reviewed. The first group consisted of 69 patients selected for bronchography from a total of 1711 patients seen with acute pneumonia. All but one of the 69 were between 18 and 25 years of age. The second group consisted of 25 patients whose history or chest roentgenograms suggested chronic bronchiectasis. One third of this group were more than 30 years of age and none of these patients had a recent pneumonic process.

Of the 69 patients who had had acute pneumonia, 29 were found to have bronchiectasis and 39 were found to be normal. One patient had an

abnormal bronchogram that reverted to normal on the repeat study. Of the 18 patients who had not had an immediately preceding pneumonia, 5 had bronchiectasis and 13 were normal. Seven patients with asthma and chronic cough were studied.

The results of this study indicate that bronchiectasis is a common pulmonary lesion and that its presence should be considered during the course of an acute pneumonia when certain clinical features are manifest. The most important of these features is a persistently abnormal chest roentgenogram indicating incomplete resolution of the pneumonic process. The density should be present for at least one month and preferably for two months to be considered significant. Changes of longer duration only slightly increase the likelihood of the diagnosis of bronchiectasis.

The extent of the density has no diagnostic significance. The appearance of the abnormality is of some significance in that the presence of "peribronchial mottling" adds somewhat to the possibility that bronchiectasis is present. The presence of other roentgenographic findings, such as segmental collapse and localized emphysema or the appearance of "honeycombing," are of considerable diagnostic significance in that they suggest preexistent pulmonary disease. Parenchymal rales that persist longer than clinical signs of activity and are out of proportion to the degree of roentgenographic abnormality are of considerable importance. Wheezes and rhonchi do not have this significance. If, in addition to the above findings, the patient's pneumonia is characterized by prolonged fever, continued productive cough, and leukocytosis, the diagnosis of bronchiectasis is rendered more likely.

It is shown that bronchiectasis is found in an appreciable number of patients with pneumonia, that its presence can be suspected on clinical and roentgenographic grounds, and that the lesion is probably permanent. The most intriguing question still remains, namely, the relationship that exists between the two conditions.

Two possibilities logically explain the distinctive aspects of the pneumonia present in those patients later shown to have bronchiectasis. An underlying bronchiectasis could predispose to a more protracted course of pneumonia or, alternatively, a more severe pneumonic infection could so damage normal lung as to leave some permanent damage in the form of bronchiectasis. The only absolute method of deciding between these two explanations would involve the performance of bronchograms in unselected normal subjects and the repetition of the procedure in those who developed pneumonia. This was not done for obvious reasons.

The most that one can say is that the bronchiectasis first noted after a recent pneumonia may possibly, but not definitely, have been caused by the acute infection. Further proof will be necessary to establish this as a certainty. (Ruberman, W., Shauffer, I., Biondo, T., Bronchiectasis and Acute Pneumonia: Am. Rev. Tuberc., 76: 761-767, November 1957)

## Exposure in Treatment of Burns

The Cocoanut Grove, Texas City, and Hartford circus fires and the USS Bennington explosions are examples of severely burned patients in large numbers. The possibility of atomic explosion resulting from either military or industrial use of atomic energy could cause an even more staggering burn problem.

The exposure technique of managing the burned surfaces is extremely well suited to such a catastrophe. It is of utmost importance that all workers in various phases of medicine, first aid, nursing, and associated fields not only have a thorough working knowledge of the general management of burns, but also realize the advantages and peculiarities of the exposure technique. Under major disaster conditions, it may be the only workable means of treating large numbers of casualties with a limited number of trained personnel.

Efficient management of burn casualties demands standardization of techniques. The optimum requirements may be comprised to meet the situation, but in general must include blood and electrolyte to manage shock, tetanus antitoxin or toxoids, some sedation for relief of pain, nasogastric suction for gastric dilation, tracheotomy for burns of the respiratory passages, antibiotics in large doses, maintenance on a high-caloric, high-protein diet with supplementary vitamins, and a standardized simple method of managing the burned wounds. The treatment of the burned surface—while the most spectacular phase of the burn problem—is secondary to the patient's general condition and should be deferred until his condition is stable.

The exposure method is well adapted for use in the individual case, but becomes mandatory in planning for mass casualty problems. It consists of leaving the burned surfaces open to the air with the resultant formation of a dry protective eschar. No medication is applied to the surfaces, but they are not ignored. There are several marked advantages. Great stockpiles of costly sterile dressing materials are unnecessary. Trained personnel and operating rooms are free to administer to the other needs of the patients instead of being involved in time-consuming dressing changes. The tourniquet effect of dressings on respiration and limbs is eliminated. The temperature regulatory mechanism is not hampered in the elimination of excess body fluid and body heat as so often happens under most dressings.

The patient's morale is better, because the extent of the burn is not exaggerated by a circumferential dressing. Odor is almost absent. Most important of all, infection is markedly reduced.

Deep second-degree burns are not subject to the threat of maceration with resultant conversion to full-thickness injury. The coagulum presents a very poor culture medium. It is dry and relatively cool. When areas of infection occur, they can be noted quickly and drained easily, thus preventing

destruction of what islands of epithelium are present and minimizing the amount of necessary grafting. Toxic absorption from the surface is thereby reduced.

Initially, the patient is placed on sterile sheets, or if these are not available, freshly laundered sheets. Overlying sheets are supported on a frame or cradle to ward off draft, but in such a way as not to touch the surfaces. A comfortable temperature is 75 to 80° F; the presence of a draft will cause chilling. In wards full of casualties, the doors and windows should be screened and gowns and masks worn. Masks have not been used when the occasional burn patient is managed by the exposure treatment technique on the open ward. There has been very little difference in the infection rate.

Burned areas initially are debrided very gently with removal only of loose materials washed with hexachlorophene and flushed with saline. Dressings and any previously applied medication are thereby removed. No topical antibiotics or other agents are used locally. Blisters are initially left intact.

After 48 to 72 hours, a dry coagulum forms. This protects the surface from air and the patients are reasonably comfortable, usually requiring very little sedation. The burned areas must be inspected daily; on the first signs of an infection of the wound or of any significant temperature elevation of the patient, further debridement is done. Infected blisters are removed and a new coagulum forms very nicely after the infected areas are debrided. This debridement can be done simply, on the ward, with an intravenous dose of narcotic.

Certain areas of the body require special attention in the exposure technique. Hands and arms should be maintained at mild elevation. In order to prevent a contracture, they should perform active motion in a warm saline bath after 72 hours, or when the eschar begins to crack. This should be done for 20 minutes, twice a day. In the interim they may be left exposed at elevation to prevent edema. The coagulum will not become as firm as in other areas, but it serves as a very effective covering. Under this technique, these partial-thickness burns heal as rapidly as in other areas. Full-thickness areas are treated with dressings in preparation for grafting as soon as they have declared themselves—usually in 10 to 14 days.

Patients with burns of the anterior neck, of the chest, and of the lower face should be maintained with the neck in extension in order to minimize formation of flexion contractures of the neck. Circumferential burns can be managed by the exposure technique. This requires that the patient be turned either in bed or, preferably, on a Stryker frame from front to back at 4- to 6-hour intervals, permitting all areas to be open to the air for equal periods. A drying light bulb over the area will aid in the formation of the eschar.

Once the coagulum is formed, if the patient is not ambulatory, turning must continue or breakdown occurs. There are certain disadvantages to the exposure method. A hospital environment—or at least a warm building—is

necessary during the first 72 hours until a coagulum forms. Transporting of the patient in this early phase is not advisable without some form of dressings. Circumferential burns do require turning at frequent intervals. However, it is the belief of the author that the exposure technique is the most economical and practical means of treating most extensive burns and is especially helpful in mass casualties. (CDR G. T. Van Petten MC USN, The Exposure Method in the Treatment of Burns: Arch. Indust. Health, 16: 416-421, November 1957)

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## Diagnosis and Prognosis in Periodontal Disease

It is apparent that periodontal disease must be recognized earlier if patients are to receive proper preventive care and avoid the development of an advanced condition which accounts for over 50% of all teeth lost.

Many signs lead to the detection of early periodontal disease, but it is necessary to "think periodontally" in order to see them. As the trained eye scans a roentgenographic series, variations from the normal soon become apparent. Changes in the alveolar crest are to be seen early in the disease. The cortical plate or lamina dura disappears and the area immediately below appears radiolucent. Thickening of the periodontal space as a result of trauma first appears close to the marginal crests and continues, involving the entire periodontal membrane.

Variation in the height of labial and lingual supporting bone is often missed unless the radiodensity is observed carefully. A line which indicates the level at which both plates of bone and the root exist may be seen crossing the root; superior to this level, one plate and root can be seen. Which level is higher, buccal or lingual, can be determined only by probing.

The level of the crest in itself is an important indication of the degree of periodontal involvement. Normally, the interproximal crest is found near the cemento-enamel junction, perhaps 1 mm. below. Examination of individual roentgenograms will show variations from this norm throughout a series.

Perhaps the one most reliable and easily discernible clinical sign of periodontal disease is mobility. The ends of rigid instruments should be used for testing, with the tooth being rocked between them. Testing with the fingers is misleading as the soft tissue of the finger tips is depressible and they give a false impression of movement.

Mobility can be classified in degrees as No. s 1, 2, and 3. If movement of the slightest amount greater than normal is detected, it is classified as No. 1. No. 2 mobility is that amount of movement which allows the crown to move 1 mm. in any direction from normal. No. 3 mobility permits the tooth to move more than 1 mm. in any direction and also permits its alveolus to be rotated or depressed.

It is interesting to note that the amount of bone present around a tooth as observed in the roentgenograms may have no relation to the degree of mobility. The periodontal space and the type of bone present, however, influence mobility to a great degree.

Other readily observable signs of periodontal pathosis should be considered. Variation from the normal pink color of the gingiva is usually a sign that disease is present. An early sign is marginal redness due to traumatic occlusion, subgingival calculus, or dietary deficiency. Changes in the gingival form can be diagnosed readily, but must be looked for to be seen. Unless the eye focuses on soft tissue, clues will be missed. Conditions that may be present are Stillman's clefts, McCall's festoons, recession, gingival enlargements due to many etiologic factors, and the typical blunting at the interproximal crest in necrotic gingivitis among many others. Suppuration is a sign of a more advanced disease, and pus can be elicited by "milking" the gingiva, that is, exerting a stroking pressure on the gingiva in an apical to an occlusal direction.

Occlusal trauma is a most common etiologic factor in periodontal disease. Frequently, esthetically poor anterior alignment will give a clue to the presence of malocclusion An overly long anterior tooth or one which protrudes, and diastemas of recent origin—such simple signs as these—indicate a need for investigation.

The variations from the normal seen in this one field of dentistry are myriad. At any time, the dentist can observe changes not previously seen in his experience. It is necessary to learn the significance of each of these variations so that the next time they are seen they will be recognized for what they are and what they mean.

The following factors should be considered in determining prognosis:

1. Extent of the pocket
2. Alveolar bone support
3. Mobility
4. Number of teeth remaining
5. Distribution of remaining teeth
6. Age
7. Health
8. Cooperation of the patient

With these principles for establishing a proper diagnosis and for selecting treatable teeth, the aim of treatment becomes clear. Treatment should be directed toward the removal of causes of periodontal disease which involved teeth that have the ability to respond. (Arvins, A. N., Diagnosis and Prognosis in Periodontal Disease: J. Am. Dent. Assn., 55: 621-625, November 1957)

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## The Treatment of Patients with Ureteral Calculi

The treatment of patients with ureteral calculi has occupied a prominent place in the urological literature for the past 50 years. The majority of the stones found in the kidney pass into the ureter and, in many instances,

are expelled spontaneously. Of 2862 patients with calculi admitted to seven hospitals in Richmond, Va., during a 5-year period, 58.9% had ureteral calculi; of 1732 patients with ureteral calculi reported by six urologists, 12.9% passed stones spontaneously and of 1467 patients, 35.9% passed stones following cystoscopic examination. Of 651 patients admitted to McGuire Veterans Hospital and to the Hospital Division of the Medical College of Virginia, 90 passed stones unaided, while an additional 89 admitted with kidney colic were eliminated from this study because no stone could be found upon admission.

The normal constrictions of the ureter present natural barriers to the passage of stones. The volume, shape and surface of a stone, as well as pathological strictures or ureteral spasm, may also interfere with spontaneous expulsion.

The authors have attempted to correlate reports in the literature concerning management of ureteral calculi and to review their own experience with this problem over the past 5 years with the hope that they may be better equipped to determine the best treatment for the individual patient with an ureteral stone.

It is apparent that most physicians and patients look upon cystoscopic methods of removing calculi from the ureter as a minor procedure. As a consequence, many ureteral injuries have occurred in recent years and the period of incapacity has been prolonged unnecessarily in many instances. The entire ureter is easily accessible to the skilled surgeon and the disagreeable sequellae of prolonged drainage and persistent infection described by Crowell are rarely encountered.

That an accurate diagnosis be made when possible before deciding upon the type of treatment to be instituted, is important. When the patient is seen during an attack of renal colic, the relief of pain becomes the first consideration. Usually, this is accomplished by an adequate dose of morphine accompanied by an antispasmodic drug. Regardless of the fact that physiologists find little evidence of effect on the ureter by these drugs, the authors have seen additional relief from calcium gluconate too often for it to be coincidental. The senior author is confident that depropinex and octin mucate also have some relaxing effect upon the ureter. Atropine should be given with the opiates. The application of heat—preferably by immersing the patient in a hot tub—is also helpful. Hot water bottles or heating pads are used when the tub is impractical. If pain is relieved, cystoscopic examinations or treatment should be deferred and an intravenous urogram made. This will show the condition of the opposite kidney and, usually, the location of the stone and the presence or absence of dilatation of the ureter and renal pelvis above the stone. In cases of complete obstruction, contrast material may not appear on the affected side. A nephrogram will indicate recent obstruction. Films taken one or two hours after the injection will often show evidence of function not seen on earlier films. The

history and appearance of the stone shadow are helpful in determining the condition of the kidney when no contrast substance appears. A large shadow with a history of previous attack of renal colic is evidence of prolonged back pressure with permanent damage to the kidney.

The patient should be kept ambulatory if practical, and after the urogram has been made, should be encouraged to drink large quantities of water. If given a chance, many small stones will pass spontaneously during the 48 hours following an attack. An average of stones passed spontaneously after the patient had seen the urologist, as reported in the literature, was approximately 30%. In the authors' group of 651 patients, 8% passed the stone spontaneously following hospital admission. An additional 86 patients, admitted during the same period because of renal colic, were not included in this study because examination failed to disclose any evidence of ureteral stone Obviously, most of these had passed a small stone.

If the preliminary study shows a stone no larger than the caliber of the normal ureter in its narrowest area, 3 mm., and there is good drainage around it, the stone should be given further opportunity to pass unaided except for the administration of antispasmodic drugs, opiates when needed, and liberal amounts of fluids. These little stones are usually easy to remove and add decidedly to the statistical evidence of the advantages of cystoscopic methods of treatment, but most of them will pass without mechanical aid if given a chance. In some cases, active intervention is necessary because of uncontrolled pain, accompanying infection, or the convenience of the patient. Repeated urograms are advisable to determine the progress of the stone and the effect it is having on the kidney until it has passed. The interval of these studies varies according to the symptoms presented, but should not be more than 3 months apart. An examination is desirable following a severe attack of colic. If the expense of repeated intravenous urograms is burdensome, an office cystoscopic observation of the bladder following the administration of indigocarmine will give a good idea of the function of the kidney. So long as the stone is making some progress and the kidney has good drainage, active intervention is not mandatory. Active treatment is usually necessary when the stone is definitely larger than the narrowest portion of the ureter if it appears to have a rough or irregular surface, if it is impacted with impairment of the renal function, if there is dilatation of the ureter and/or the renal pelvis, if there is infection, and if the stone has been observed for 6 months without evidence of progress. A stone in the upper third of the ureter producing any degree of obstruction should be removed by ureterolithotomy. If the stone is small and causing no obstruction, time may be allowed with the hope that it will pass into the lower third of the ureter from which it can be more easily extracted.

The majority of stones lodged in the lower third of the ureter can be encouraged to pass by dilating the ureter or by the use of stone baskets or loops. The senior author prefers the method described by Alyea. In any

event, the ureter should be dilated to a size equal to the caliber of the stone before baskets or loops are used. A stone impacted in the ureter, one that is accompanied by dilatation of the upper urinary tract or infection, and a stone that is larger than 5 cm. in diameter, should, in the authors' opinion, be removed immediately. (Dodson, A. I., Sipe, W. R., Lord, K. H., The Treatment of Patients with Ureteral Calculi: J. Urol., 78: 575-583, November 1957)

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## Nonosteogenic Fibroma of Bone

Nonosteogenic fibroma is a benign defect in the metaphyseal region of the long bones, displaying rather characteristic histologic and radiologic features, and occurring predominantly in young people. Whether it is a neoplasm, a developmental defect, a reaction to injury, or a residue of inflammation, is controversial.

The frequency of this condition is not accurately known because: (1) disagreement exists among observers with regard to diagnostic nomenclature for this lesion; and (2) many cases are probably asymptomatic and are never discovered. It is more common than generally believed.

Roentgenologically, this represents one of the most distinctive lesions of the skeleton with respect to size, shape, location, and over all appearance. It is consistently metaphyseal and eccentric in location. It may consist of a very small oval defect in the periphery of the cortex; it may extend into the medullary cavity, occupying a considerable width of the bone; or it may involve the entire thickness of a bone in such thin bones as the fibula, ulna, and radius. It is radiolucent, oval in shape, and usually longer than wide. Only occasionally does one exceed 5.0 cm. in length and rarely more than one lesion may exist in the same bone.

The periphery is sharply demarcated from the surrounding bone in all cases. The larger lesions often exhibit irregular smooth loculations, separated from the marrow cavity by a thin "scalloped" zone of sclerotic bone. The loculations are more apparent than real, being represented by ridges of increased density in the wall of the lesion. Occasionally, peripheral lesions may exist which extend outward from, and usually communicate with, the main lesion. Rarely, there may be no significant peripheral zone of increased density, and the lesion may appear merely as an oval, punched-out lesion, eccentrically situated in the metaphyseal cortex of a long bone. The roentgenographic diagnosis would be uncertain with such findings as these.

The clinical manifestations of this condition are not remarkable. Usually, attention is drawn to the lesion following some form of trauma and the first symptom is a fracture is a sizable number of cases. Lesions

which occur at the site of a muscle or tendinous attachment may be symptomatic, but when symptoms are present, they are usually mild. The majority of these defects are discovered incidentally, the patient having no symptoms directly referable to the fibrous lesion.

Each lesion must be treated individually. If one is dealing with a typical metaphyseal defect, its mere presence is not necessarily an indication for surgery. Those which produce symptoms, those which are unusually large, and those through which a fracture has occurred should be removed. Small symptomless lesions which do not increase in size may be observed at intervals without great concern; but it is essential that one be thoroughly familiar with the radiographic picture in order to decide which may be safely left alone. If there is any doubt, excisional biopsy should be accomplished.

Those lesions which are subject to surgery should be excised en bloc or thoroughly curetted. The defect—if significant in size—should be packed with bone chips in order to hasten healing and promote future strength of the bone. In the fibula, a lesion may be removed by segmental resection without bone grafting provided that it is not too near the ankle or knee. Postoperative x-ray therapy is neither necessary nor advisable, and may be harmful. (Compere, C. L., Coleman, S. S., Nonosteogenic Fibroma of Bone: Surg. Gynec. & Obst., 105: 588-598, November 1957)

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## Rheumatoid Spondylitis

This article describes the clinical manifestations of rheumatoid spondylitis and its impact upon the social and economic life of the individual.

Rheumatoid spondylitis is a systemic disease which characteristically involves the spine in young men with painful ankylosis. The manifestations may range from a painless stiffening of the spine or occasional "sciatica," on the one hand, to a severe wasting, painfully deforming kyphoscoliotic spinal disease with severe iritis and secondary amyloidosis. Most patients who have had the disease for 6 months will demonstrate bilateral roentgenographic evidence of sacro-iliac disease. Only rarely will sacro-iliac changes be absent in cases of over 5 years' duration. The syndesmophyte formation in the perispinal ligaments, which in its most advanced form produces the picture of the so-called "bamboo" spine, is a later and less regular finding. The presence of bilateral sacro-iliac disease documented by appropriate x-rays is almost invariably present in rheumatoid spondylitis and is considered an essential diagnostic feature.

In the clinics and on the wards of the Veterans Administration Center, Los Angeles, Calif., the authors have observed some 300 cases of rheumatoid spondylitis of which 100 were available for this review.

The 100 cases chosen for this study represent a selected series by virtue of the fact that all were veterans of World War I through the Korean War, and were necessarily in reasonably good health prior to their enlistments. All the cases had definite bilateral sacro-iliac changes by x-ray. The proximity to the Veterans Administration Hospital, the interest of the patients in seeking Veterans Administration care, the fact of their current follow-up status, or their admission to the hospital for a problem related or unrelated, and other unknown factors, all tended to weight this series generally in the direction of a predominance of males in lower income brackets with fairly severe disease.

Eighty-eight patients of the total group had had their disease for at least 8 years and were evaluated for the socio-economic study. They were divided into three groups. Group I consisted of 18 cases who were never unemployed for over 3 months because of symptoms related to their rheumatoid disease. Group II consisted of 37 cases who were temporarily totally disabled (disabled over a period of 3 consecutive months) and who at the time of the survey were employed. Group III consisted of 33 patients who were unemployed at the time of the study. The authors are aware that this classification is arbitrary, but it proved most advantageous for the evaluation of data.

Because this was a veteran population, the predominance of males over females in this series was 99:1, rather than the usual approximate 10:1. The predominance of males with rheumatoid spondylitis as opposed to the high incidence of females with classic peripheral rheumatoid arthritis has often been cited as evidence that the two processes are separate.

The symptomatology of this group of spondylitics was fairly typical. The frequency of fatigability and generalized stiffness as initial or concomitant symptoms bears emphasis. The locus of initial symptoms in the dorsal and (in one case) the cervical spine should be noted. Symptoms in the thoracic spine are often accompanied by pleuritic-like pains. Involvement of the 44 costospinal joints of the ribs, as well as the ribs themselves, in what is apparently a perichondritis and arthritis of the costosternal joints may mimic pulmonary or cardiac disease.

Further evidence of the systemic nature of the disease is emphasized by the degree of weight loss which was in excess of 20 pounds (and often over 30 pounds) in one third of the cases.

The anemia was generally mild. From the data, it would seem that if the hemoglobin in a spondylitic is below 10.00 gm. one should look for an additional cause for the anemia.

The incidence of iritis in 33% of the cases is high, the usual figure being about 10%. In 10 of the present 33 cases with iritis, the spine alone was involved. It has been stated that iritis occurs only in the presence of peripheral joint involvement. The data indicate that iritis occurs in patients who generally have a more severe form of the disease which usually—but not necessarily—includes peripheral joint involvement.

From the authors' data, it is clear that the patients in Group I generally had mild disease, no hip involvement, little iritis, and little peripheral joint involvement. Two of these patients had typical "bamboo" spines, and three had marked "ligamentous" calcification approaching "bamboo." One of the patients with a "bamboo" spine had had severe spinal flexion deformities which were largely relieved after about one month of corrective exercise and traction.

By the foregoing criteria, the patients in Groups II and Group III had more severe disease. The increased incidence of hip involvement in Group III correlated well with the generally stated experience that progressive hip involvement, rather than the degree of spine involvement, seemed to be the most significant determining factor in a patient's ability to make a satisfactory economic adjustment. It is equally true that in a given case severe peripheral joint involvement other than the hips may be the limiting factor in a patient's socio-economic adjustment, but this is not so regularly predictable as hip disease. Not one of the cases in Group I had objective evidence of hip involvement at the time of the present survey.

The authors' usual program of treatment consists of a maximal trial of conservative therapy followed by one to three courses of x-ray therapy for relief of pain in the event the former is unsuccessful. They concur with the conclusions of Brown and Abbatt on the results of their preliminary study of leukemia in spondylitics treated by x-ray, that the suggested slight increase of leukemia in such patients is so minimal that it leaves unaltered the indication for x-ray therapy. If a patient is refractory to the foregoing modalities, then Butazolidin is tried with the patient under close observation for evidences of toxicity. It should be made clear that the authors' hope, with present modes of therapy, is relief of pain and prevention or correction of deformities. No known modality of therapy arrests this disorder. (Sweezey, R. L., et al., Rheumatoid Spondylitis: A Clinical and Socio-Economic Study: Ann. Int. Med., 47: 904-918, November 1957)

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## Ophthalmia Neonatorum Prophylaxis

In view of frequent reactions to silver nitrate which have been reported as high as 100%, 3 years ago, the author began using penicillin ophthalmic ointment. It was immediately apparent that fewer reactions occurred. Two and one-half years ago, a controlled study to determine the frequency and severity of ocular reactions using penicillin and bacitracin ophthalmic ointments was begun. The disadvantages of using penicillin in ophthalmia neonatorum prophylaxis were reviewed during a recent round table conference of ophthalmologists who pointed out that penicillin was ineffective against most gram-negative organisms. Most physicians are well aware

of the severe ocular reaction that may occur after a few instillations of penicillin ophthalmic ointment. Also, it may be possible to sensitize the infant to penicillin so that a systemic reaction might occur later in life when penicillin is again given. Bacitracin is bactericidal and is effective against many coccal (including the gonogoccus) and some bacillary forms. It is virtually nontoxic when used topically and its potency is stable. It would rarely be used systemically later in life compared to penicillin. Primary hypersensitivity reactions to bacitracin are rare and allergic manifestations are practically nil.

Several authors have advocated that no prophylaxis be given or that simple irrigation of the eyes with saline or washing with Zephiran solution be done. These suggestions are the result of a decreased frequency of gonorrhea ophthalmic infections in the newborn period, and the ability of antibiotics to control such infections quickly when they occur.

The Board of Health of the City of New York repealed a section of the sanitary code which removed the requirement that prophylactic measures of any sort must be taken at the birth of a child for the prevention of ophthalmia neonatorum. Schultz and Hartmann and Lehrfeld also noted the high incidence of untoward reactions with silver nitrate and reported 18 cases of gonorrhea ophthalmia neonatorum which occurred after silver nitrate prophylaxis had been given.

The purpose of this study was to evaluate the type of ocular reaction to bacitracin and penicillin ophthalmic ointments and to determine if possible their effectiveness in preventing infections of the newborn infant's eyes. The study was carried out in the U. S. Naval Hospital, Corona, Calif. From January 1, 1953 until August 27, 1954, silver nitrate (1% in wax ampules) was used in 2250 infants. The eyes were irrigated with saline immediately following the instillation of 1 or 2 drops of the silver nitrate solution. The physical limitations of a small nursery and a small post-partum bed capacity necessitated using the rooming-in plan so that most of the infants were taken to their mothers by 24 to 36 hours of age. Frequent complaints were made by the mothers about the red swollen eyelids and the purulent discharge which often occurred during the first few days. Although an accurate account was not maintained, well over 50% of the newborn infants' eyes showed a mild to severe chemical conjunctivitis during the first 3 to 4 days which was the usual duration of hospitalization.

The comparative study using penicillin ophthalmic ointment (1000 units per gm.) or penicillin solution (5000 units per ml.) was started in August 1954. These preparations were instilled inside the lower lid one time only shortly after birth. One or two drops of the solution or approximately a 1 cm. strip of ointment was used. From September 1954 to August 1956, a total of 7036 infants were given ocular prophylaxis using the penicillin solution or ointment. During the period from February 15, 1955 to August 1, 1956, a careful appraisal was made of each infant's eyes (5394 newborn infants) at the initial examination in the first 24 hours, and again at discharge

on the third or fourth day. No significant difference was noted in the number of reactions between aqueous penicillin drops and ophthalmic ointment and, therefore, these were considered as one preparation referred to as penicillin ointment. Bacitracin ophthalmic ointment (500 units per gm.) was substituted for penicillin ointment in August 1956. From this time until July 1, 1957, a total of 2380 infants were given ocular prophylaxis as described for penicillin. A one-eighth ounce tube of ointment could be used for 25 to 30 newborn infants and if not used within one week, the tube was discarded. Excessive ointment was not removed from the eyelids.

During the first 18 months of the study, the author observed a low reaction rate to penicillin ointment and in the last 11 months an equally low reaction to the bacitracin ointment. The frequency and degree of ocular reactions to the two ointments are tabulated. There were no severe reactions and a total of only 1% of mild and moderate reactions for each of the two ointments.

The total number of reactions (including infections) appear to be low when compared to other recent reports in which comparison studies were made with erythromycin (10%), Terramycin (4.5%) (5.7%), penicillin (10%), and sodium sulfacetamide (4%). The author's figures are higher than those reported for penicillin ointment (0%) by Mallek and others, Allen and others, and by Culler and Clark using Aureomycin drops (0%). This variation is probably due to a difference in the classification of reactions, whether an infection was called a reaction, the period of observation in the hospital, and the duration of observation after discharge. The technique of instilling the ointments or solutions is a major factor, particularly, if more than one application is given. The strength of the preparation used must also be considered. Allen has recently pointed out that most of the ophthalmic solution or ointment is washed out of the conjunctival sac within 20 minutes in the normal eye. Considering this factor, one wonders if it is of any value to administer one application of an antibiotic or silver nitrate to the newborn infant's eyes in order to prevent an ocular infection, particularly, when gonorrheal conjunctivitis can be treated so effectively with penicillin intramuscularly. This danger has decreased greatly in the past decade.

Elliot has pointed out that "sticky eyes" (possible infections) which occur several days after delivery are often due to cross infection between the babies and the staff personnel. Still another cause may be due to mechanical irritations which occur in spite of minute attention given to the technique of cleansing the infant's eyes and applying the prophylactic material. The author strongly believes that the best prophylaxis would be to observe carefully the newborn infant's eyes for evidence of infection for several days after delivery without touching or using anything in the eyes at birth. But, until definite conclusions can be reached and further evidence is available as to the necessity of using any prophylaxis at all, a safe, effective, and nonirritating bactericidal ointment in the newborn infant's eyes

should be used. It appears that bacitracin ophthalmic ointment fulfills these criteria. (CDR A. M. Margileth MC USN, Comparison of Ocular Reactions Using Penicillin and Bacitracin Ointments in Ophthalmia Neonatorum Prophylaxis: J. Pediat., 51: 646-651, December 1957)

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## Management of Acute Head Injuries

Acute head injuries are a condition which of necessity will have to be handled for the most part by general practitioners simply because there are so many head injuries and so few neurosurgeons. Having cleared the air with this conclusion, Dr. Leonard T. Furlow of Washington University, St. Louis, Mo., proceeds to develop a rationale for treatment. This he divides into initial evaluation and definitive treatment.

Proceeding stepwise in the initial evaluation, the state of consciousness should be determined. In the unconscious patient it is urgent to make certain that an open airway exists, taking whatever steps are necessary from postural drainage to emergency tracheotomy. Whatever is necessary should be done without delay because cerebral anoxemia can do great damage in a relatively short time. Once an open airway is established, oxygen should be administered. If the patient is not deeply unconscious, the intact cough reflex may make much of the foregoing unnecessary. The next step is to control shock, disregarding the head injury for the moment except for the control of scalp hemorrhage. Blood expanders, plasma, or blood, as available with other supportive measures should be vigorously employed to bring shock under control.

Finally, in the initial evaluation the patient should be surveyed for any other injury with particular attention to the possibility of spine or spinal cord damage because this may govern the next most important procedure.

Definitive treatment begins with the decision regarding the need for immediate surgical attention. When blood and pulped brain tissue exude from a scalp laceration, it is clear a compound depressed skull fracture exists and debridement is indicated as soon as the patient's general condition will permit. Dr. Furlow believes it is better to transport the patient to the neurosurgeon where he will have the benefit of his usual armamentarium for support than it is to bring the neurosurgeon to the patient. (This view is one expressed to a group of industrial physicians who are not likely to find themselves on their own in an isolated situation, so does not necessarily represent the situation sometimes facing a military medical officer.)

Any of the following signs or a combination of them generally indicate that surgery may be necessary:

1. Deepening coma in a patient not in shock
2. Progressive focal neurological signs
3. Dilated pupil
4. Cerebrospinal rhinorrhea
5. A fracture line which on x-ray is seen to cross the groove for the middle meningeal artery
6. A depressed fracture, simple or compound
7. The presence of air within the cranial cavity
8. A shift of the calcified pineal from its usual midline position

In the past, there has been overemphasis on the recognition of extradural hemorrhage from the middle meningeal artery. It is a serious but relatively rare lesion and its absence does not exclude indications for surgery. Surgery is indicated in approximately 20 to 30% of acute head injury cases. When indicated, it should be undertaken only by one qualified to carry through whatever procedures are dictated by the findings at operation. Thus, the responsibility of the attending physician resolves itself into two areas: (1) deciding whether surgery is indicated, and (2) instituting measures that will reduce morbidity and mortality. The latter involves several controversial issues.

Spinal puncture is a focal point of controversy. Furlow advocates its conservative use when there is good justification such as, for diagnostic purposes in an unconscious patient showing no signs of sustained increased intracranial pressure or as a therapeutic measure to relieve the headache, photophobia, and stiff neck which may develop several days after the injury. When done, he cautions that it should be under manometric control and in no case should jugular compression be done. Such increase of venous pressure may cause renewed bleeding or brain stem herniation.

Dehydration debates are regarded as pointless because the claimed virtues of this regime have not been demonstrated. The head injury patient, as any other sick individual, has fluid electrolyte and protein needs and they should be handled appropriately.

Cerebrospinal rhinorrhea indicates a route of access for infection which deserves antibiotic prophylaxis.

Bladder function should be carefully observed as a full bladder induces undesirable restlessness. An indwelling catheter should be used if needed and appropriate safeguard against urinary infection set up.

Sedatives which do not depress respiration such as chloral hydrate, paraldehyde, or barbiturates may be indicated to reduce restlessness, but should not be allowed to obscure such matters as a distended bladder. Morphine is contraindicated for head injury patients because of the respiratory depression.

Radiographic study may be important, but rarely is an emergency. The minimum adequate study is four views properly positioned including each side, an A-P and a P-A view.

Bed rest has a place in the care of these patients, but should not be overdone. Ambulation may be permitted when the patient is conscious, rational, and has no other injury contraindicating it. (Furlow, L. T., Management of Acute Head Injuries: Indust. Med. & Surg., 26: 459, October 1957)

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## New Film Releases

The Bureau of Medicine and Surgery's current releases of films in the Nursing Care series comprise a total of ten films in three groups for the training of hospital corpsmen in three of the basic parts of patient care. Ranging in length from 5 to 21 minutes, these films have an average running time of about 13 minutes. All are "how-to-do-it" training aids, precisely planned and produced for use in hospitals and Hospital Corps schools.

The first of the three groups is MN-8211, "Vital Signs" consisting of three parts: A - "Cardinal Symptoms" (21 min.); B - "Taking Temperature, Pulse and Respiration" (20 min.); and C - "Taking Blood Pressure" (11 min.). These films explain the vital signs by means of live action, animation, art work, and sound effects; they demonstrate the techniques with patients under a variety of conditions. In "Taking Blood Pressure," sound effects are made especially useful in acquainting the operator with the significant changes in pulse tone.

The second group, "Needle Injections," MN-8405, consists of three parts: A - "Equipment and Medications" (15 min.); B - "Intradermal, Subcutaneous and Intramuscular Injection Techniques" (8 min.); and C - "Intravenous Injection Technique" (5 min.). These films illustrate the purpose of injection, emphasize the need for aseptic procedure, show the preparation of equipment and of the various forms of medication used, and demonstrate in detailed steps the techniques of each method of injection. The third part shows the doctor and corpsman working together and makes the point that the doctor performs the actual insertion except when the corpsman is called upon to do so in an emergency. A feature of all three parts is extreme close-up photography from the operator's point of view to show small objects clearly and to point up details of manipulation.

The third group, MN-8567, "Basic Nursing Care," includes the following films: A - "Making an Unoccupied Bed" (13-1/2 min.); B - "Making a Recovery Bed" (10 min.); C - "Making the Occupied Bed" (15 min.); and D - "The Bed Bath" (18-1/2 min.). These films show the equipment and supplies needed and demonstrate the exact procedure in each case, with emphasis on the contribution made to the progress and well-being of the patient.

CDR Elizabeth B. Seidl NC USN represented the Bureau as associate technical adviser during the planning and production of the films in these

series. Performers were all Navy personnel and included the following personnel of the Hospital Corps as principal demonstrators of the procedures shown: Bruce Austin, Charles Arn, Lawrence Palmer, Roger Blum, and Gene Ault.

The films listed in this article are part of an open-end series. As new films are needed for instruction or to replace old ones made obsolete by change and improvement in technique they are produced in accordance with the latest professional information and with current requirements for inclusion in training programs.

Prints of all the films described are being distributed to District Training Aids Sections and Libraries, naval hospitals and Hospital Corps schools, and to certain other specific stations that have an established need for such materials. Where prints are not available, inquiry may be addressed to the Film Distribution Unit, Training Division, Bureau of Personnel, Department of the Navy, Washington 25, D. C. (AudioVis, BuMed)

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## From the Note Book

1. LCDR J.H. Ebersole MC USN, Medical Officer aboard the USS Seawolf, presented a paper and showed illustrative slides on medical experiences in nuclear-powered submarines at a meeting of the United Services Section of the Royal Society of Medicine held at London, December 5, 1957. (TIO, BuMed)

2. CAPT N. L. Barr MC USN and CAPT W. M. Snowden MC USN represented the Bureau of Medicine and Surgery at the U. S. Air Force Physiological Training Officer Symposium conducted at the Gunter Branch School of Aviation Medicine, Gunter Air Force Base, Montgomery, Ala., 2 - 6 December 1957. (TIO, BuMed)

3. The following lantern slide sets have been added to the usual teaching materials and are available for loan from the Armed Forces Institute of Pathology:

   a. "Seminar on Lesions of the Breast" (ASCP 1956), consisting of 105 2" x 2" color slides.
   b. "Occupational Health Aspects of Dermatology" (USPHS), consisting of 47 2" x 2" color slides. (AFIP)

4. Dentures are now being made to a considerable extent from self-curing resins. These resins cure without the application of heat, and they have properties of dimensional accuracy and stability that are equal to, or better than, those of the older heat-cured resins. Although similar to the methyl

methacrylate materials used for many years, the self-curing resins differ in that accelerators have been added to the resin monomer or liquid. The accelerators promote free radical formation which causes the polymerization of the resin to be initiated at room temperatures. As part of a general program for studying the basic properties of dental materials, the National Bureau of Standards recently undertook an investigation of the relative dimensional stability of the two types of dentures. (NBS)

5. Contracts with six research organizations for production of new potential anticancer compounds were announced by the Public Health Service. The Service's National Cancer Institute at Bethesda, Md., said that chemicals to be synthesized under these contracts are designed to interfere with the growth of cancer cells in various ways. One group of compounds, known as antimetabolites, inhibits the growth of cancer cells by blocking certain metabolic reactions (life processes). These compounds resemble needed chemicals and are accepted by the cells. However, they differ from the needed chemicals enough to interfere with the cells' metabolic processes of self-repair and self-reproduction. (PHS, HEW)

6. It appears that the prime requisite of the attending physician examining the patient with the complaint of backache is that he exercise every care and diligence to obtain a very careful and detailed history covering all medical aspects of the individual, that he complete and record a detailed physical examination, and coordinate his findings with proper laboratory and x-ray studies. (PostGrad. Med., November 1957; F. J. Cox)

7. This study shows that some patients may remain well for from 6 to 10 years after recovery from bacterial endocarditis, especially if aortic regurgitation is not present. Healed bacterial endocarditis must now be considered in the differential diagnosis of mitral regurgitation and of aortic regurgitation. (Ann. Int. Med., November 1957; B. Hall, M. D.)

8. Two hundred and eighty-seven cases of hilar and mediastinal adenitis due to tuberculosis were studied over a 30-month period in Old Delhi, India. The incidence in females was 2.3 times that of males, and the maximal incidence occurred at a later age (10 to 20 years) among females than among males (3 to 10 years). Ambulatory chemotherapy proved to be practical. The value of prolonged antituberculous chemotherapy was stressed by the finding that improvement became more marked while unsatisfactory results became less frequent the longer the chemotherapy was continued. Chemotherapy for at least 1 year would seem indicated for all cases of tuberculous hilar and mediastinal adenitis. (Am. Rev. Tuberc., November 1957; D. N. Shivpuri, B. Ban)

9. Myocardial fibrosis is defined as a diffuse replacement or invasion of the myocardium by fibrous connective tissue to such an extent that there is interference with the action of the heart. This article reports the hemodynamic findings in patients studied by various standard methods including right heart catheterization. (Circulation, November 1957; E. D. Robin, M. D., C. S. Burwell, M. D.)

10. Ocular findings in 5 patients with sickle cell disease are presented. Fundus changes included retinitis proliferans, aneurysmal vascular dilations, arborizing vascular networks, focal constriction, dilatation, sheathing, and obstruction of arterioles and venules, the development of chalk-white vessels owing to changes in intravascular contents, preretinal hemorrhages which closely simulate retinal tears, and vitreous and retinal hemorrhages. (Arch. Ophth., November 1957; G. Goodman, M. D., et al.)

11. Traumatic rupture of the diaphragm is a rare injury, important because of the frequency of early and late complications of mediastinal shift, hemorrhage and strangulation or perforation of hollow viscera. Operation is the treatment of choice. (Arch. Surg., November 1957; T. Perry, M. D., et al.)

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## Recent Research Reports in Aviation Medicine

(See page 40)

Naval Air Development Center, Johnsville, Pa.

1. NADC-MA-5705, 1 May 1957, The Effect of Inflation of a Pressure Suit upon Pulmonary Diffusing Capacity in Man.
2. NADC-MA-5707, 26 April 1957, The In Vitro Effect of Some Hypophyseal Hormones on Phosphorylating and Dephosphorylating Mitochondrial Enzymes.
3. NADC-MA-5709, 23 July 1957, The Effects of External Pressurization upon the Cardiovascular System in Dogs. I. Physiological Aspects.
4. NADC-MA-5710, 13 August 1957, Changes in $S^D$ and $S\Delta$ Rates During an Operant Discrimination.
5. NADC-MA-5711, 13 August 1957, Body Weight and Food Intake Measures During Instrumental Learning.
6. NADC-MA-5713, 8 August 1957, Modification of the Thermal Radiation Method for Assessing Antinociceptive Activity in the Rat.

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The printing of this publication was approved by the Director of the Bureau of the Budget, 16 May 1955.

## Recent Research Reports

### Naval Medical Research Unit No. 3, Cairo, Egypt

1. Needle Biopsy of the Liver and Spleen in Bilharzial Patients. Report I, A Histopathologic Study, NM 52 02 03.5, June 1957.
2. Studies on Endamoeba Gingivalis. Report I, Methodology and Preliminary Report. NM 75 02 03.1, August 1957.
3. Oral Pathology Survey, Siwa Oasis. NM 75 01 03.2, August 1957.
4. Needle Biopsy of the Liver and Spleen in Bilharzial Patients. Report II. Experience in 363 Biopsies. Part 3. Clinical Evaluation of the Procedure. NM 52 02 03.5, September 1957.
5. Survey of Egyptian Rodents for Dental Caries Research. NM 75 01 03.3, September 1957.

### Naval Dental Research Facility, Great Lakes, Ill.

1. Dental Caries Activity and the pH, Titratable Alkalinity and Rate of Flow of Human Parotid Saliva. NM 75 02 27, August 1957.
2. Identification of Amino Acids on Paper Chromatograms Using a Polychromatic Indicator. NM 52 06 04.4.1, August 1957.

### Naval Medical Field Research Laboratory, Camp Lejeune, N.C.

1. Development and Evaluation of a Dental Operating Trailer for Field Use. NM 91 00 09.1, August 1957.
2. Development of Hidal (Helicopter Insecticide Dispersal Apparatus, Liquid) NM 51 02 09.1.9, September 1957.

### Navy Mine Defense Laboratory, Panama City, Fla.

1. A Laboratory Pressure Pulse Generator for Use in Animal Experiments on the Effects of Air Blast Waves. NM 64 01 23, September 1957.
2. Laboratory Production of Compression Waves in Water, and the $LD_{50}$ for Mice for Pressure Waves with a Rise Time Shorter than 0.3 Millisecond. NM 64 01 23, September 1957.

### Naval School of Aviation Medicine, NAS, Pensacola, Fla.

1. Inventory Testing of Vocational Interests of Naval Aviation Cadets: Final Results. NM 14 02 11 Subtask I, Report No. 23, 15 April 1957.
2. Note on the Predictive Validity of Physical Training Phase Grade. NM 14 02 11, Subtask I, Report No. 22, 6 May 1957.

3. Effect of Hypoxia on the Serum Iron and the Unsaturated Iron-Binding Capacity of Serum in Rats. NM 12 01 99, Subtask 2, Report No. 2, 16 July 1957.
4. Cardiac Function During Lipemia. NM 18 03 11, Subtask 6, Report No. 1, 23 July 1957.
5. Note on Factors Related to Group Status. NM 16 01 11, Subtask 4, Report No. 3, 26 July 1957.
6. Further Attempts at Coding Aircraft Accidents. Report No. 2, NM 15 01 11, Subtask I, 31 July 1957.
7. Review of Methods Previously Employed to Produce a Homogeneous Visual Field and the Description of a Newly Devised Technique. NM 17 01 99, Subtask 2, Report No. 14, 1 August 1957.

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BUMED INSTRUCTION 6010.5B 21 November 1957

From: Chief, Bureau of Medicine and Surgery
To: U.S Naval Medical Centers, Hospitals, and Hospital Ships

Subj: Collection of unpaid accounts and reporting to the Bureau of Medicine and Surgery accounts uncollectible

Ref: (a) GAO Regulation No. 129 of 30 July 1956
(b) NavCompt Manual, para. 04300
(c) BuMedInst 1620.2
(d) MarCorps Manual, Vol I, Chap. 15, part E
(e) Army Regulation 35-1820
(f) Air Force Manual No. 160-20, art. 419
(g) NCPI 45.10-4

Encl: (1) Sample third letters

This instruction prescribes a uniform policy and procedure for:

a. Collection of unpaid accounts without recourse to law.
b. Reporting to the Bureau of Medicine and Surgery accounts uncollectible.
c. Removing from the records of the facility, accounts reported to the Bureau of Medicine and Surgery as uncollectible.

BuMed Instruction 6010.5A is canceled.

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BUMED INSTRUCTION 12010.3 26 November 1957

From: Chief, Bureau of Medicine and Surgery
To: U. S. Naval Hospitals and Medical Centers

Subj: Employment of civilian therapeutic dietitians in naval hospitals

Encl: (1) Guideline position description

This instruction authorizes the employment of civilian therapeutic dietitians to meet requirements above that provided by military personnel assigned.

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BUMED NOTICE 6200 27 November 1957

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: CH-1 to BuMed Instruction 6200.3A of 2 July 1957, Subj: U. S. Navy preventive medicine units

This notice deletes the listing of U. S. Navy Preventive Medicine Unit No. 8, U. S. Naval Hospital, Yokosuka, Japan, on page 2 of subject instruction. This unit was disestablished by SecNav Notice 5450 of 1 October 1957.

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BUMED INSTRUCTION 6240.3 2 December 1957

From: Chief, Bureau of Medicine and Surgery
To: Chief of Naval Operations
Commandant of the Marine Corps
Commander, Military Sea Transportation Service
Chief, Bureau of Aeronautics
Chief, Bureau of Ships
Chief, Bureau of Yards and Docks

Subj: Standards for drinking water

Ref: (a) SecNavInst 6240.1, Subj: Standards for Drinking Water

This instruction transmits certain enclosures with recommendations pertaining to their modification and applicability to the Department of the Navy as may apply to the health of naval personnel.

# SUBMARINE MEDICINE SECTION

## How Far Is Deep?

A civilian diver using an air supplied deep sea diving suit made two working dives to 45 feet. Both dives were of 30 minutes duration. The source of air was from a gasoline compressor. Some time after surfacing from the second dive, he reported dizziness and localized pain in left hip and head. Observers reported him as showing no muscular weakness but being poorly coordinated. No medical officer was available. The diver was treated by a diving officer. On the basis of pain in the head and poor coordination and the fact that as pressure was applied, pain was relieved at 75 feet, but all symptoms were not relieved until reaching 115 feet, the case was evaluated as a "serious" one and treatment using Treatment Table No. 3 was started. The pressure in the chamber was reduced by stages according to the schedule, but after 28 minutes at the pressure equivalent to 60 feet the symptoms and signs recurred.

The patient was taken back to a pressure equivalent of 165 feet. After 20 minutes at this depth the symptoms were relieved and decompression was completed using Treatment Table No. 4. This apparently resulted in complete relief of the symptoms. Total time of treatment was 21 hours and 44 minutes.

### Comment

This sort of report disturbs the equanimity of those who would regard diving and its related physiology on a mechanical basis. By Navy standards, a dive to 50 feet for 78 minutes may be made without taking any decompression other than the 2 minutes spent returning to the surface (ascent rate of 25 feet per minute). Why did this diver develop decompression sickness? or was it decompression sickness?

The report cites pain in the hip and head, poor coordination but no muscular weakness—the result of a knowledgeable layman's examination. The diver was receiving his air from a gasoline compressor. On occasion, it has been noted that exhaust gases could get into the intake port of a compressor and compress carbon monoxide and other undesirable constituents with the diver's air. Carbon monoxide poisoning might explain the pain in the head and lack of coordination, but this is not a likely explanation of the pain in the hip. All the symptoms and signs could be evidence of decompression sickness. The fact that they cleared up under pressure, recurred

under treatment, and then were again relieved under increased pressure is all supporting evidence. But the treatment for carbon monoxide poisoning is to supply oxygen. Breathing air at 165 feet gives the same oxygen partial pressure as breathing 120% oxygen at the surface—if such a thing were possible at the surface. One might venture a supposition that the symptoms recurred at 60 feet because the partial pressure of oxygen at this depth is equivalent to 56% oxygen at the surface and this might not have been enough oxygen to relieve the symptoms. The success in treating the patient on Table No. 4 might be explained as an influence of sufficient oxygen for a considerably longer time. All this is based on the concept that the symptoms of carbon monoxide poisoning are caused by the resulting anoxia and are relieved by an adequate oxygen supply.

This case can be examined from another view. This depth and this bottom time certainly do not cause one to expect decompression illness. Two dives in a short time—even to these relatively shallow depths—are more likely to result in difficulty than a single dive for the total time. In recognition of this increased hazard, it is standard practice to require the diver to decompress for the total time of both dives following the second dive (Art. 833(2), U. S. Navy Diving Manual, NavShips 250-880, 1952 edition). Even so, this still should have been safe. No violation of standard practice is found here. The diver was 33 years old, weighed 165 pounds, and was 5 feet and 10-1/2 inches tall. It is reported that he was doing moderately strenuous work. Certainly, he was not obese nor was he elderly. From this approach we obtain no help in understanding the case. Was it decompression illness or carbon monoxide poisoning? We will never know, but this can be said—the correct action was taken and the patient was relieved.

Never dally about commencing treatment by recompression if decompression is a reasonable possibility. The increased pressure will not be detrimental to other conditions. Failure to treat decompression illness promptly and adequately can have serious, even fatal, consequences.

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# DENTAL SECTION

## Diplomates of American Specialty Boards - DC USN

The following list of U. S. Navy Dental officers on active duty were certified by specialty boards recognized by the American Dental Association:

American Board of Oral Surgery

Rear Admiral Ralph W. Taylor - 1948
Captain Theodore A. Lesney - 1949
Captain Roger G Gerry - 1949
Captain Arthur S. Turville - 1950
Captain Harold G. Green - 1950
Captain Harvey S Johnson - 1955
Captain Donald E. Cooksey - 1956
Captain Raymond E. Huebsch - 1952
Captain Walter W. Crowe - 1952
Captain Joseph F. Link - 1953
Captain Wilbur N. VanZile - 1954
Captain William B. Johnson - 1955
Captain Gerald H. Bonnette - 1956
Captain Edward A. Gargiulo-1956

American Board of Prosthodontics

Captain Arthur R. Frechette - 1950
Captain Benjamin Oesterling - 1950
Captain William M. Fowler - 1951
Captain Stephen T. Kasper - 1951
Captain Frank M. Kyes - 1951
Captain John V. Niiranen - 1951
Captain Charles D. Hemphill-1952
Captain Frank E. Jeffreys - 1952
Captain Harold L. Superko - 1952
Captain Judge C. Chapman - 1953
Captain John B. Stoll - 1953
Captain Mack L. Parker - 1953
Captain Walter W. Dann - 1953
Captain Henry A. Collett - 1954
Captain Charles W. Miller-1954
Captain Gordon L. Miller - 1954
Captain Herbert J. Towle - 1954
Captain Walter J. Demer - 1955
Captain Robert B. Lytle - 1955
Captain William E. Gullett - 1955
Commander James B. Lepley - 1955
LtCdr Oren H. Gaver - 1955
Captain Milton H. Brown - 1956
Captain Charles M. Heartwell - 1956
Captain Davis Henderson - 1956
Captain Allen L. McInturff - 1956
Captain Myron G. Turner - 1957
Captain William M. Marking - 1957

American Board of Periodontology

Captain Claud M. Fraleigh - 1956
Commander Jerome F. Peters - 1956
Captain Allan L. Wallace - 1957

American Board of Oral Pathology

Captain Robert A. Colby - 1951
Commander Henry H. Scofield - 1957

American Board of Pedodontics

Cdr Gordon H. Rovelstad - 1951

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## Last DT Classes Enrolled at Bainbridge

The U. S. Naval Dental Technician School, NTC, Bainbridge, Md., convened its last dental technician class (Class "A" Basic) on December 9, 1957. Prosthetic Technician class (Class "C") is also in session. The Dental Technician School will be disestablished after the graduation of these classes in April 1958.

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# RESERVE SECTION

## Reserve Training in Non-Pay Medical Corps

The non-pay medical company consisting of physicians, nurses, and Medical Service Corps officers, of which there are 50 such units established throughout the continental United States, provides excellent training in military subjects and naval medicine.

These companies schedule 24 to 48 drills annually, and annual 14-day active duty for training for their members is authorized within quotas and funds available. These medical companies conduct their training through the medium of "package curricula" developed by the Naval Medical School and furnished through the Bureau of Medicine and Surgery. Package curricula on atomic and preventive medicine have been furnished these units and current planning includes package curricula on the care of mass casualties for the coming two succeeding fiscal years.

The following medical companies are established in the below listed cities:

First Naval District
1-1 Boston, Mass.
1-3 Portland, Me.
1-6 Lowell, Mass.
1-2 Providence, R.I.
1-5 Worcester, Mass.

Third Naval District
3-1 New Haven, Conn.
3-4 St. Albans, N. Y.
3-6 Hartford, Conn.
3-8 Hackensack, N. J.
3-2 New York, N. Y.
3-5 Brooklyn, N. Y.
3-7 Montclair, N. J.

Fourth Naval District
4-1 Pittsburgh, Pa.
4-4 Philadelphia, Pa.
4-14 Cleveland, Ohio
4-3 Philadelphia, Pa
4-13 Columbus, Ohio
4-16 Cincinnati, Ohio

Fifth Naval District
5-5 Portsmouth, Va.
5-6 Washington, D. C.

Sixth Naval District
6-4 Charleston, S. C.
6-8 Miami, Fla.
6-7 Memphis, Tenn.
6-10 Atlanta, Ga.

Eighth Naval District
8-1 Dallas, Texas
8-3 Tyler, Texas
8-2 New Orleans, La.
8-5 New Orleans, La.

Ninth Naval District
9-1 St. Louis, Mo.
9-4 Kansas City, Mo.
9-6 Des Moines, Iowa
9-8 Cedar Rapids, Iowa
9-14 Minneapolis, Minn.
9-19 Rochester, Minn.

Ninth Naval District (continued)
9-21 Denver, Col.
9-3 Indianapolis, Ind.
9-5 Detroit, Mich.
9-7 Duluth, Minn.
9-9 Lincoln, Neb.
9-17 Milwaukee, Wis.
9-20 Chicago, Ill.

Eleventh Naval District
11-1 Los Angeles, Calif.
11-6 San Diego, Calif.

Twelfth Naval District
12-1 Berkeley, Calif.
12-4 Oakland, Calif.
12-2 San Rafael, Calif.
12-5 San Francisco, Calif.
12-6 Berkeley, Calif.

Thirteenth Naval District
13-2 Seattle, Wash.
13-3 Portland, Ore.

Membership in these units is available to eligible interested Reserve Medical Department officers. Additional information concerning scheduled drills, training, and benefits available may be obtained by communicating with the district medical officer within the respective naval district.

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## AVIATION MEDICINE DIVISION

### Navy Units Commended for Search and Rescue Effort

Following the recent civilian airline accident in the Pacific, the Navy had an opportunity to participate in the largest sea-air search and rescue in history. Nineteen bodies were recovered and taken aboard the USS Philippine Sea (CVS-47). The senior medical officer aboard the USS Philippine Sea, LT. CDR. Neil V. White MC USN had the task of tentatively identifying and supervising the preservation and disposition of the bodies.

The Civil Aeronautics Board requested Captain William M. Silliphant MC USN, Director, Armed Forces Institute of Pathology, to provide aviation pathology support in the investigation. Captain Silliphant made available for this purpose Captain Vernie A. Stembridge USAF (MC), Chief of the Aviation Pathology Section, and Captain William M. Crafft MC USN who at the time was on temporary additional duty at the Armed Forces Institute of Pathology under instruction in aviation pathology. These officers were flown to the USS Philippine Sea by COD aircraft while the carrier was still

at sea. They performed the external examination of the bodies including the clothing prior to docking. Upon arrival of the ship at Long Beach, the Coroner of Los Angeles County assumed custody of the bodies. He had arranged for a special task force of approximately 25 personnel, consisting of pathologists (including the pathologists from the Armed Forces Institute of Pathology), an anthropologist, an FBI identification team, a photographer, x-ray technicians, stenographers, and embalmers. The x-ray technicians and equipment were from the USS Haven. A comprehensive investigation was conducted including a study of the human factors as well as aircraft wreckage.

The Board of Supervisors for Los Angeles County on 19 November 1957 passed a special resolution commending the following naval facilities for their effort: The officers and men of the USS Philippine Sea; the Commanding Officer and men of the U. S. Naval Base, Long Beach; and the Armed Forces Institute of Pathology, Washington, D. C.

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## The Need to Replace the A-5 Seat Cushion

Presentation of information on the A-5 Seat Cushion to the Aircrew Escape Systems Equipment Group Management meeting, McClellan AFB, Calif., 17 July 1957, resulted in recommendation by this group that the A-5 cushion be replaced with the MC-1 and MC-2 cushions, because foam rubber seat cushions more than 3 inches thick increase the likelihood of vertebral fractures during ejection, impact, or buffeting. There are two reasons for this:

1. With a thick cushion, force is imposed on the seat for a considerable time before it is imposed on the pilot. As a result, force acts on the pilot for a shorter period of time resulting in his being subjected to higher "G" loads than is the seat. A thick seat cushion, therefore, functions as a mechanical amplifier of "G" force.
2. A 3-1/2-inch cushion (A-5) can be compressed to one-half inch. This allows the pilot 3 inches of play in the seat regardless of harnessing. In the bent position which is often assumed when the cushion is compressed, the force required to fracture vertebrae is decreased by a factor of 5 or 6.

Vertebral fractures are occurring because of these features of the A-5 cushion. The above information is presented in order to alert the Flight Surgeons to the dangers that exist when individual pilots add extra, nonapproved seat padding to their cockpit seats. (Excerpt: Act. Rpt., Aero Med. Lab., WADC, Wright-Pat. AFB, Ohio, 13 August 1957)

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## Explosive Decompression Incident

While flying an XF8U-1 on 4 September 1957, a pilot inadvertently jettisoned the canopy at an altitude of 48,500 feet and at 0.90 Mach. The events inducing the canopy loss were a function of the experimental flight and specialized configuration of the test aircraft. Cabin pressure prior to canopy loss was 19,000 - 20,000 feet.

The aircraft was equipped with a diluter demand oxygen system, regulator part No. R83PR2867-B1. One hundred percent oxygen was used from the ground up providing approximately 8 or 9 minutes preoxygenation prior to decompression. The safety pressure switch was placed on the "ON" position during the climb. The pilot was dressed in summer-weight socks, shorts, undershirt, flying coveralls, and gloves. Paratroop type boots, a Toptex helmet with visor, Hardman oxygen mask retainer and an A-13-A oxygen mask with Darling stretch resistant hose were also worn. The pilot's visor was down throughout the flight.

The pilot did not see the canopy leave the airplane, The explosive decompression was recognized as such by an explosive sound, followed by condensed vapors momentarily filling the cockpit, and turbulence in the cockpit. The canopy was then noted to be missing and a rapid descent was initiated at idle engine power. The pilot was not aware of any physiological effects at the moment of decompression. However, it was imperative to hold the oxygen mask hard against the pilot's face to prevent excessive outboard leakage until lower altitudes were reached. If this was the advent of safety pressure, it was not recognized as such by the pilot. It should be noted that the mask was adjusted as tight as practical for normal flying.

Early during the descent, the airplane became supersonic. Still no adverse physiological effects were evident; hence, the descent was continued at supersonic speeds. Speed was decreased to subsonic values at lower altitudes in an effort to reduce buffet level in the cockpit which was considered intense throughout the descent. The pilot was very concerned about ambient temperatures, but a feeling of coldness was not experienced until passing through 35,000 feet. Extreme cold was never experienced.

The speed brake was deployed at approximately 35,000 feet to reduce speed and yet maintain a high rate of descent. Noise level was very high throughout the descent until speed was reduced to about 300 knots at the lower altitudes. The noise level continued to interfere with radio communication until the speed was reduced to about 250 knots. Cockpit buffet level continued to be intense throughout the descent. Prior to landing, the airplane was flown at slow speeds and the cockpit buffet level was considered heavy at 210 knots and moderate at 170 knots in the cruise configuration. All loose harness ends had been tucked in prior to flight and remained stowed during the incident.

No physiological effects due to decompression or buffet were noted after landing. However, approximately one hour later the pilot's throat

was noted to be sore and 3 hours later a full feeling existed in the sinus. A medical examination 4 hours after decompression revealed a mild throat irritation and a very small inflammation of one ear drum. Later effects included a sore nose, mild nasal passage irritation, slightly bloodshot eyes, mildly sore neck muscles, stomach and abdomen. In summation, there were no physiological factors evident that would have made it necessary to ground the pilot. However, the pilot was firmly convinced that 50,000 feet is the maximum altitude where explosive decompression can be tolerated without some form of partial or full pressure suit protection.

As a matter of interest, this pilot had experienced a rapid or explosive decompression several years ago in another type airplane. At 39,000 feet, a 350-square-inch windshield side panel failed for structural reasons. A fast descent was pursued and a feeling of coldness was not experienced, although the pilot was wearing summer-weight gear. It would appear that in these two cases of decompression the pilot had about one minute of body heat retention time. Only in the current case, however, were decompression after-effects noted.

It is hoped this incident will add significant knowledge towards solution of the aeromedical problems involved. It can well be used as an example of how proper use of the oxygen system and the pilot's personal equipment probably saved an aircraft and pilot.

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## Hypoglycemia

You will recall the experiment made on 20 pilots several months ago when they were asked to report to the dispensary first thing in the morning without warning for some blood sugar tests. The results were most interesting in that they proved that 8 of them had very little or no breakfast prior to a scheduled flight that morning.

Colonel William H. Lawton of the USAF Flying Training Branch presented a most interesting speech before the Joint Committee of Aviation Pathology at the Armed Forces Institute which proves rather conclusively that an inadequate diet can cause trouble.

All the students in the Flying Training Command were interviewed to find out how many of them were not eating properly before flying. It was discovered that over 50% were not getting up for breakfast. A program was then initiated to improve the eating habits of pilots by explaining to them and to their wives the importance of a well balanced breakfast, lunch, and dinner. That eggs, meat, and milk are the most important elements in breakfast and other meals, and it is these protein foods that hold the blood sugar level relatively high for a long period of time. A directive was also published in which all students and officers residing on the base were

required to eat at least two meals — breakfast and lunch — at one of the base messes. At the same time, a small snack bar was established in each of their flight briefing buildings. Foods stored in the refrigerator were milk, fruit, and good sandwiches; meats of all kinds and cheese. The use of doughnuts in these snack bars was discouraged because they consist of mostly carbohydrate and fat which might contribute to overstimulation of the pancreas. As Colonel Lawton stated, "We believe that the best part of the doughnut is the hole in the middle." The snack bars were not opened in the morning until after the pilots had taken off on their first flights, for this was not deemed a substitute for an adequate breakfast. They were opened prior to the ending of the first flight so that students and their instructors could get a bite to eat at a time when their blood sugar level could be expected to be at a comparatively low level.

Results of this program are reflected in the accident rate. The accident rate for 1954 in the Flying Training Force was 18.8, in contrast with the rate of 1955 which was 12. The reduction in 1955 occurred primarily in the latter part of the year after the program had been initiated. The accident rate for the 6-month period was as low as 10.8. In contrast, the aircraft accident rate for the rest of the Air Force for 1955 was 23, or more than double the FTAF rate. Together with the reduction in accident rate, there was a reduction in the percentage of pilot-error accidents. In 1954, the percentage of such accidents was 67; in 1955, it was 56; and in 1956, it was 47.2. Another indication is the fact that during the first 6 months after this program was started there was a 2-month period in which no fatalities occurred — the only 2 months with no fatalities since FTAF was organized in 1951.

"Non-feeding" or irregular eating habits over an extended period contributes to fatigue, human error, and possible aircraft accidents. The human body should be "refueled" just as regularly as the aircraft. There is evidence that a low blood sugar interfered with oxygenation of the central nervous system so that a mild lack of oxygen may produce symptoms which would not occur with a normal blood sugar.

In review, symptoms of a low blood sugar are sweating, flushing, pallor, numbing, chilling, hunger, trembling, headache, vertigo weakness, apprehension or fainting — depending upon how low a level may be reached.

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## Hyperventilation

Hyperventilation or overbreathing syndrome.

It has been stated that approximately one person in ten who comes to a physician for examination has faulty breathing habits. As a result, he suffers discomforts which he — and even the doctor — attributes to serious

organic disease. Symptoms: dizziness; blurred vision; fainting; palpitations and heaviness in the chest; numbness and tingling of the hands and face; or extreme anxiety and fear.

Most are unaware that they breathe too deeply, yawn or cough excessively, or drag on smokes too rapidly. (Remember the sequence of events when you constantly smoke a pipe?) Try breathing rapidly and deeply several times; you can reproduce some or all of the above symptoms. Some patients are "cured" just by demonstrating this fact.

Now, how does this affect the aviator?

First, the causes. Hyperventilation sometimes occurs during oxygen breathing. Remember how some of your buddies were affected during low pressure chamber runs (apprehension, pressure breathing, etc.)? Of utmost importance is the fact that it can be confused with hypoxia, or oxygen lack. Should there be confusion, check your oxygen equipment but don't breathe deeply. Remember also that the oxygen flow indicator on the oxygen regulator does not blink during pressure breathing because oxygen is flowing continuously.

The important point is the fact that hyperventilation is due to lack of carbon dioxide in the body—not too much oxygen. The lack of carbon dioxide is caused by breathing too deeply. At times, deep breathing or more rapid breathing is resorted to in an attempt to compensate for a shortage of oxygen at high altitudes. This could be fatal.

Function of carbon dioxide. Breathing too rapidly washes carbon dioxide out of the blood. Carbon dioxide is a waste gas, and part of the reasons for breathing is to get rid of it. But carbon dioxide also performs a useful function in the body. In order to breathe, the body must have a certain concentration of carbon dioxide to "trigger" the brain center which controls breathing. You know that it is impossible to hold your breath for an indefinite period. On the other hand, if most of the carbon dioxide is removed by hyperventilation, the body loses its stimulus to breathe voluntarily. When this happens, the individual stops breathing until enough carbon dioxide again accumulates in the body to "trigger" the system.

The U. S. Air Force School of Aviation Medicine states that "the increasing number of unexplained jet aircraft accidents indicated a need for experimental investigation of possible physiologic factors leading to a pilot's incapacity for safe flying. In addition to hypoxia, hyperventilation was suspected as being a possible cause for a critical deterioration of flying performance. In-flight sampling of expired air during three phases of jet training in the T-33, F-86, and F-100 aircraft verified the existence of in-flight hyperventilation. Incidents of hyperventilation appeared to become more frequent with the increase in high performance capabilities of the aircraft flown." (Journal of Aviation Medicine, July 1957)

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## Flight Restrictions Following Blood Donations

The following excerpt concerning flight restrictions following blood donations is taken from OpNav Instruction 3740.7 and should be called to the attention of all flying personnel:

"1. The giving of blood has become a commonplace and highly important practice. Adequate stores of blood and plasma are essential to national defense. Naval personnel should be encouraged to participate in authorized blood donor programs.

2. Although blood donors suffer no ill effects and the amount of blood donated is quickly replaced by normal bodily processes, the aviator is exposed at all times in flight to unusual demands for oxygen-carrying blood. Hence, the following restrictions should be placed on pilots and crew members who have donated blood:

a. Flying personnel should be grounded for four days after donation of 500 cc. of blood.

b. Operational commands should consider a further limitation in flights above 35,000 feet altitude, night flying, or aerobatic or gunnery tactics for a period of one week after blood donation.

c. In no instances should pilots or aircrewmen flying in combat or with operational groups off aircraft carriers donate blood within four weeks of such expected flights. This recommendation is made largely because of possible lowered resistance to fatigue or in the event of injury or illness closely following blood donation."

All Aviators are encouraged to read this OpNav Instruction in its entirety—it contains much valuable information!

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Captain Charles F. Gell MC USN, Commanding Officer of the Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pa., was recently appointed Visiting Professor of Aviation Physiology at the University of Pennsylvania School of Medicine.

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A new directive, NavTraDevCen Instruction 10380.2 of 30 July 1957, Subj: Training Device Failure Reporting System, has been distributed and implements the use of DD Form 787, Electronic Failure Report. All senior medical officers having a physiological training unit should, with the help of their Naval Training Device Center Regional Representative, make deficiency reports in accordance with this instruction.

## Reorganization of Aviation Medicine Section - Bureau of Medicine and Surgery

Due to the reorganization of sections of the Bureau of Medicine and Surgery, the following new organization of the Aviation Medicine Section should be noted and applied to the article "Aviation Medicine Section of the Bureau of Medicine and Surgery" which appeared in Vol. 30, No. 8, 18 October 1957 issue of the Medical News Letter:

Code 5 - Assistant Chief for Aviation Medicine (new title)
Code 51 - Director, Aviation Medicine Operations Division (formerly Code 53)
Code 51A - Deputy Director (newly established)
511 - Aviation Physical Qualifications Branch (formerly Code 535)
512 - Aviation Medicine Training Branch (formerly Code 536)
513 - Aviation Operational Psychology Branch (formerly Code 537)
514 - Aviation Medicine Plans and Personnel Branch (formerly Code 538)
Code 52 - Director, Aviation Medicine Technical Division (newly established)
521 - Aviation Medical Systems Requirements Branch (formerly Code 531)
522 - Aviation Medical Equipment Branch (formerly Code 5311)
523 - Aviation Medicine Safety and Flight Training Branch (formerly Code 5312)
524 - Aviation Medicine Marine Corps Requirements Branch (newly established)

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## Recent Research Reports in Aviation Medicine

### Naval Air Material Center, Philadelphia (ACEL)

1. NAMC-ACEL-287, 19 July 1956, Hardman Tool and Engineering Company A13A $O_2$ Mask Retention Fitting and Adapter
2. NAMC-ACEL-319, 27 Dec 1956, Development and Test of Pneumatic Seat Cushions; an experimental flight evaluation of prototype seat cushion assemblies
3. NAMC-ACEL-338, 30 April 1957, Roylyn, Inc., High Pressure Oxygen Check Valves AN6014-1, AN6015-2, AN6016-2, AN6017-1 and AN6018-1

☆U. S. GOVERNMENT PRINTING OFFICE : 1957 O - 441838

4. NAMC-ACEL-341, 16 Aug 1957, Receptor Contributions to the Critical Flicker Frequency Curve
5. NAMC-ACEL-342, 11 June 1957, Effects of Moderate Heat Stress, Altitude, and Time on the Dehydration Rate of Subjects Wearing the Ventilated Full Pressure Suit
6. NAMC-ACEL-347, 9 Aug 1957, Human Engineering Investigations of the Interior Lighting of Naval Aircraft (Part 14)
7. NAMC-ACEL-353, 1 Nov 1957, A Physiological Comparison of Ventilated and Non-Ventilated Anti-Exposure Suits under Simulated Cockpit Conditions
8. NAMC-ACEL - 354, 3 Oct 1957, Development and Test of Pneumatic Seat Cushions; an operational evaluation of improved prototype seat cushion assemblies.
9. NAMC-Acel-356, 1 Oct 1957, Human Engineering Investigations of the Interior Lighting of Naval Aircraft (Part 16)

(Refer to page 22)

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## Erratum

Handbook of Operation and Maintenance for Ejection Seat Trainer, Device 6-EQ-2-a, NavExos P-1024. Paragraph 3-4, last sentence: Change elapse time from 5 to 10 minutes.

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